

WHAT IS CLAIMED IS:

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1. A method for detecting line crossover in a pair of lines comprising:
determining a starting and ending point for each line in the pair of
5 lines;
determining an overlap interval;
determining if the overlap interval is a valid interval;
calculating a value for each line based on the overlap interval if the
overlap interval is valid;
10 comparing the values for each line if the overlap interval is valid; and
detecting line crossover based on the comparison if the overlap
interval is valid.
2. The method of claim 1, wherein a point on each line in the pair of
15 lines is specified by an X-value and a Y-value, and wherein the overlap
interval is defined as beginning at a smallest X-value, X1, shared by the
lines and ending at a largest X-value, X2, shared by the lines.
3. The method of claim 1, wherein the overlap interval is valid if there is
20 overlap between the lines in the pair of lines along an X-axis.

4. The method of claim 3, wherein the overlap interval is defined as $[X1, X2]$, and wherein the calculating step comprises calculating an Y-value for each line at the beginning of the overlap interval, $X1$, and an Y-value for each line at the end of the overlap interval, $X2$.

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5. The method of claim 4, wherein a point on each line is specified by an X-value and a Y-value, and wherein the comparing step comprises:

comparing the Y-value at $X1$ ($Y1a$) for a first line with the Y-value at $X1$ ($Y1b$) for a second line; and

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comparing the Y-value at $X2$ ($Y2a$) for the first line with the Y-value at $X2$ ($Y2b$) for the second line

6. The method of claim 5, wherein a line crossover has occurred if $((Y1a \leq Y1b) \text{ and } (Y2a \geq Y2b))$ or $((Y1a \geq Y1b) \text{ and } (Y2a \leq Y2b))$

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evaluate true.

7. The method of claim 1, wherein a point on each line in the pair of lines is specified by an X-value and a Y-value, and wherein a line in the pair of lines has an undefined slope, and wherein the line with undefined slope has an X-value of $b1x$, and wherein the overlap interval is valid if $b1x$ lies

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within an interval defined by the X-value at the beginning of the second line and the X-value at the end of the second line.

8. The method of claim 7, wherein a point, Y2a, represents the Y-value of the second line at b1x, and wherein the comparing step comprises:

comparing Y2a with the Y-value (Y1b) of a starting point of the line with undefined slope; and

comparing Y2a with the Y-value (Y2b) of an ending point of the line with undefined slope.

9. The method of claim 8, wherein a line crossover has occurred if $((b1x \geq X1) \text{ and } (b1x \leq X2))$ and $((Y1b \geq Y2a) \text{ and } (Y2b \leq Y2a))$ evaluate true.

10. A method for detecting an invalid polygon comprising:
(a) selecting a pair of lines from a set of lines defining a polygon;
(b) determining if the selected pair of lines crossover;
(c) determining the polygon is invalid if the selected pair of lines
5 crossover; and
(d) repeating steps (a)-(c) for remaining pairs of lines from the set of
lines.

11. The method of claim 10, wherein the selected pair of lines do not
10 share a common starting point.

12. The method of claim 10, wherein the selected pair of lines do not
share a common end point.

13. The method of claim 10, wherein the determining line crossover step
15 comprises:

determining a starting and ending point for each line in the pair of
lines;

determining an overlap interval;

20 determining if the overlap interval is a valid interval;

calculating a value for each line based on the overlap interval if the
overlap interval is valid;

comparing the values for each line if the overlap interval is valid; and

detecting line crossover based on the comparison if the overlap
5 interval is valid.

14. The method of claim 10, wherein the set of lines is a set of all
possible combination of pairs of lines in the polygon.

15. The method of claim 14, wherein the selected pair of lines do not
share a common starting point.

16. The method of claim 14, wherein the selected pair of lines do not
share a common end point.

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17. The method of claim 10, wherein the validity of a polygon is tested
after a new line is added to the polygon.

18. The method of claim 10, wherein the validity of a polygon is tested
20 after it has been completely specified.

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19. The method of claim 10, wherein the validity of a polygon is tested only after a user specifies that it be tested.

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